9th Class - PHYSICS

-: Exercise Important Short Questions :-

CH-01: PHYSICAL QUANTITIES & MEASUREMNTS

1.3. Estimate your age in seconds.

Ans. Let, my age = 15 Years. So,

1 year = 365 Days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds.

Now, My age in seconds:

= $15 \times 365 \times 24 \times 60 \times 60$ sec
= 473040000 sec.
= **4.73×10^8 sec.**

1.5. What role SI units have played in the development of science?

Ans. SI units have brought consistency and uniformity in calculation and results. SI units are very helpful to exchange scientific and technical information at the international level.

1.6: What is meant by Vernier constant?

Ans. The least count of Vernier calipers is known as Vernier constant.

Vernier Constant:

- It is ratio between smallest readings on main scale to the total division on Vernier scale.
- The difference between one small division on main scale & one Vernier scale division.

Formula:

$$\text{Vernier constant} = \frac{\text{Smallest reading on main scale}}{\text{No. of divisions on vernier scale}}$$

CH-02: DYNAMICS

2.5: Can a body moving at a constant speed have acceleration?

Ans. **Yes,** a body moving at a constant speed may have acceleration.

Explanation:

Since, $$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$$

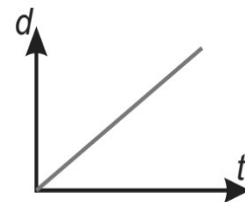
As velocity is a vector quantity which may change due to change in magnitude (speed) or direction. Hence, a body moving with constant speed may have acceleration due to change of its direction (i.e., in circular motion.)

2.7: Sketch a distance time graph for a body starting from rest. How will you determine the speed of a body from this graph?

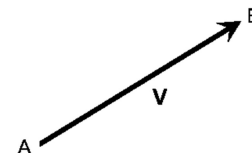
Ans. The shape of the distance – time graph is shown in figure.

Determination of speed:

Slope of d-t graph gives the speed.

Slope of the distance time graph $= \frac{\text{Change in distance}}{\text{Change in time}} = \frac{\Delta d}{\Delta t} = \text{Speed}$

2.10: How can vector quantities be represented graphically?

Ans. Graphically, a vector is represented by a straight line with an arrow head at its one end.

- The length of the line gives the magnitude.
- Arrow head represents the direction.

2.11: Why vector quantities cannot be added and subtracted like scalar quantities?

Ans. Vectors cannot be added and subtracted like scalars because vectors have **both magnitude and direction** while scalars have only direction. Vectors are added graphically.

2.12: How are vector quantities important to us in our daily life?

Ans. Vectors quantities are important to us in our daily life because they **provide complete information** about quantity i.e. magnitude and direction.

For Example: The location of a point is represented by using vectors.

CH-03: KINEMATICS:

3.2: What is the law of inertia?

Ans: Newton's first law of motion deals with the inertial property of matter, so it is also known as law of inertia.

Statement:

"A body continues its state of rest or of uniform motion in a straight lien provided no net force acts on it".

3.3. Differences between:

Action	Reaction
• It is a force that is exerted by body on other body. • **Example:** Let, force of $\vec{A}$ on the other body $\vec{B}$ is called action force.	• It is also a force which is exerted by the other body on first one. • **Example:** Let force of B on the first body A is called reaction force.

3.6. Why does a passenger move outward when a bus takes a turn?

Ans: When a bus takes a sharp turn, its passengers fall outward. It is ***due to inertia.*** As they want to continue their motion in a straight line thus, they fall outwards.

3.9 Action and reaction are always equal and opposite. Then how does a body moves?

Ans: According to Newton's 3rd law of motion, action and reaction are always equal and opposite but they **always act on different bodies**, so they do not cancel each other's effect. Thus, under the action of these forces a body moves.

3.11 When a gun is fired, it recoils. Why?

Ans: **Reason:** As the gun is fired, bullet shoots out of the gun and acquires some momentum. **To conserve the momentum** of the system, the gun recoils.

3.16 Why roiling friction is less than sliding friction?

Ans: Rolling friction is much less than sliding friction.

Reason: Because in case of rolling friction, contact area (**cold welds points**) of the two surfaces is very small as compared to sliding friction.

3.17 What do you know about "Banking of Roads"?

Ans. **Banking of Roads:** The phenomenon of raising outer edge of the curved road, is called banking of roads.

Advantage: This provides necessary centripetal force to the vehicle to take safer turn on the curve road.

3.19. Why the spinner of a washing machine is made to spin at a very high speed?

Ans. **Reason:** When Spinner of a washing machine spins at high speed, the water from wet clothes is forces out through the holes due to **lack of centripetal force.**

CH-04: TURNING EFFECT OF FORCES

4.3 When a body is said to be in equilibrium?

Ans: A body is said to be in equilibrium if it satisfies both **conditions** of equilibrium:

i. Net force acting on it is zero. $\Sigma F = 0$.

ii. The resultant torque acting on it is zero. $\Sigma \tau = 0$.

4.9. Give an example of a moving body which is in equilibrium.

Ans: A **paratrooper coming down** with terminal velocity (constant velocity) is in equilibrium as all the forces acting on it is equal to zero, which ***satisfies the first condition*** for equilibrium.

4.11. Think of a body which is at rest but not in equilibrium.

Ans: A body thrown upward is at rest just for a while at highest point. But, force of gravity still acts on it to produce acceleration. Thus, the body is at rest but not in equilibrium.

4.12. Why the height of vehicles is kept as low as possible?

Ans: **Reason:** This lowers their centre of gravity and ***helps to increase their stability***. As to make them stable, their centre of mass must be kept as low as possible

CH-05: GRAVITATION:

5.3: Do you attract the Earth or Earth attracts you? Which one is attracting with a larger force? You or the Earth.

Ans.

- Yes, Earth attracts us and in reaction we attract Earth as well.
- Both of these forces are equal in magnitude BUT opposite in direction (According to Newton's 3rd law).

5.4: What is the field force?

Ans. **Field Force:** The force acting on a body whether, the body is in contact with it or not is called field force.

Example: Gravitational Force

5.5: Why earlier scientists could not guess about the gravitational force?

Ans. It was because they were not known about the concept of gravity. Concept of gravity was 1st Introduced by Issac Newton in 1665.

5.6: How can you say that gravitational force is a field force?

Ans. The gravitational pull of the earth acts on the body whether the body is in contact with earth or not. So, gravitational force is a field force.

5.7: Explain, what is meant by gravitational field strength?

Gravitational Field Strength: In the gravitational field of the earth, the gravitational force per unit mass is called gravitational field strength.

Value: Near the surface of Earth, its value is $\mathbf{10\ Nkg^{-1}}$.

5.10: Why does the value of g vary from place to place? OR 5.12: Explain how the value of g varies with altitude.

Ans. **Variation in the Value of 'g':**

Value of gravitational acceleration is determined by following formula:

$$g_h = \frac{GM}{(R+h)^2} \quad \Rightarrow \quad g_h \propto \frac{1}{(R+h)^2}$$

Since, g is inversely proportional to $(R+h)^2$. It means that with increasing altitude, value of g decrease. That's why the value of g varies from place to place.

5.16: On what factors the orbital speed of a satellite depends?

Ans. As orbital speed of a satellite is, $v_o = \sqrt{g\,r}$

So, it depends upon: (i) Value of 'g' (ii) Orbital radius (r = R + h)

CH-06: WORK AND ENERGY

6.2. Why do we need energy?

Ans: We need energy to perform work. Energy is necessary for running and walking for humans.

6.3. When does a force do work? Explain.

Ans: Work is done when force acting on a body displaces it in the direction of applied force.

6.7. Why fossils fuels are called non-renewable form of energy?

Ans: The fossil fuels take millions of years for their formation. So, these are known as nonrenewable resources.

6.9. Which form of energy is most preferred and why?

Ans: Solar energy is most preferred energy.

<u>**Reasons:**</u> (i) Sunlight does not pollute the environment in any way.
(ii) Solar energy reaching Earth is thousand times more than the energy consumption of mankind.

6.10. Name a device that converts mechanical energy into electrical energy.

Ans. ***Generator*** is a device that converts mechanical energy into electrical energy.

6.11. Name the five devices that convert electrical energy into mechanical energy,

Ans: <u>**Devices:**</u>

i. Washing machine ii. Electric motor iii. Electric grinder iv. Electric spinner v. Juicer

CH-07: PHYSICAL PROPERTIES OF MATTER

7.7. It is easy to remove air from a balloon but it is very difficult to remove air from a glass bottle. Why?

Ans: <u>**Reason:**</u> It is very difficult to remove air from a glass bottle because ***air pressure in the bottle is less*** than atmospheric pressure but it is easy to remove air from a balloon due to lower external pressure.

7.12. Why does the atmospheric pressure vary with height?

Ans: <u>**Reasons:**</u> Density of air is not uniform in the atmosphere. It decreases continuously as we go up. Hence, atmospheric pressure is also decreased.

7.21. Why does a piece of stone sink in water but a ship with a huge weight floats?

Ans: Ships and boats <u>**float on water**</u>. It is because the up-thrust of water is greater than the weight of ships and boats. Ships have less density and large volume.

A stone <u>**sinks in water**</u>. It is because the **up-thrust** of water is smaller than the weight of stone. Stone has high density and small volume.

CH-08: THERMAL PROPERTIES OF MATTER

8.1. Why does heat flow from hot body to cold body?

Ans: Heat flows from hot body to cold body, due to temperature difference, **to attain** the thermal equilibrium.

8.4 How does heating affect the motion of molecules of a gas?

Ans: On heating the gas, its molecules get high kinetic energy and start to **collide** forcefully. Thus, motion of gas molecules is increased by heating. Pressure and volume of gas molecules also increase by heating.

CH-09: TRANSFER OF HEAT

9.2 Explain why double walled glass vessel is used in thermos flask?

Ans. <u>**Reason:**</u> Because double walled glass vessel has air between two glass walls that provides good insulation.

9.11. What is greenhouse effect?

Ans: <u>**Greenhouse effect:**</u>

Greenhouse effect is the result of infrared light not being able to transmit it back through the atmosphere into space after it has been radiated to the earth from the sun.

All the Very Best …. ☺